IN THE SPECIFICATION:

Please amend the paragraph starting at page 4, line 18, and ending at line 27, as follows.

--If, however, there occurs an unexpected deviation between diffraction gratings to be accumulated, the diffraction efficiency of light of the order of orders different from the design order substantially increases, which causes considerable deterioration of the image quality. It is therefore necessary to adjust the positioning, at high precision, of the diffraction gratings to be accumulated for manufacture of an accumulation-type diffraction grating.--

Please amend the paragraph starting at page 5, line 1, and ending at line 13, as follows.

--Generally, for optical axis adjustment where two dioptric lenses are adhered to each other, the two adhered lenses may be rotated with respect to the optical axis so as to reduce the eccentric amount of the light transmitted. However, as regards a diffraction grating to be used as a diffraction lens, for example, since it used its advantage of an achromatic effect, the focal length as a lens is long, and, on the other hand, the eccentric amount of the light transmitted is small. Therefore, the optical axis adjustment method described above ~~can not~~ cannot easily be used. Further, this method is not usable in the processes shown in Figures 2A - 2I.--

Please amend the paragraphs starting at page 10, line 2, and ending at line 21, as follows.

--In accordance with a seventh aspect of the present invention, there is provided a method of manufacturing a diffractive optical element ~~as~~ according to any one ~~of them~~ recited above, wherein it includes a process for fitting the protrusion as formed on the one diffraction grating into the recess as formed on the other diffraction grating.

In accordance with an ~~eights~~ eighth aspect of the present invention, there is provided a method of manufacturing a diffractive optical element ~~as~~ according to any ~~one of them~~ process recited above, wherein it includes a process in which, after one diffraction grating surface is formed, another diffraction grating surface is formed by use of a mold, wherein a protrusion and/or a recess formed on the one diffraction grating surface is fitted into a recess and/or a protrusion formed on the mold for the other diffraction grating surface, whereby those diffraction grating surfaces are mutually positioned and molding of the other diffraction grating surface is performed.--

Please amend the paragraph starting at page 11, line 14, and ending at line 18, as follows.

--In accordance with a further aspect of the present invention, there is provided an optical system having a diffractive optical element according to any one of the aspects of the present invention described above.--

Please amend the paragraph starting at page 12, line 8, and ending at line 10, as follows.

--Figures 2A - 2I are schematic and sectional views for explaining manufacturing process for an accumulation-type step-like diffraction grating.--

Please amend the paragraphs starting at page 13, line 6 and ending at line 11, as follows.

--Figure 12 is a schematic and sectional view of an accumulation-type diffractive optical element according to an embodiment of the present invention.

Figure 13 is an enlarged section of an outer peripheral portion of an accumulation-type diffractive optical element.--

Please amend the paragraph starting at page 13, line 24, and ending at line 27, as follows.

--Figure 20 is a sectional view of a mold and an accumulation-type diffractive optical element, according to another embodiment of the present invention.--

Please amend the paragraphs starting at page 14, line 1, and ending at line 27, as follows.

--Figure 21 is a sectional view of an accumulation-type diffractive optical element.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments of the present invention will now be described, first with reference to Figures 3 - 11 of the accompanying drawings.

Figure 3 is a sectional view of a diffractive optical element (diffraction-type lens) of eight-level step-like structure according to a first embodiment of the present invention. There is a glass substrate 10 on which a first diffraction grating (first periodic structure) 11 is formed. There is a second diffraction grating (second periodic structure) 12 formed on the first diffraction grating 11. The first diffraction grating 11 is formed by molding a photo-setting resin containing, as a main component, denatured epoxyacrylate having a high refractive index and a large dispersion. The second diffraction grating 12 is formed by molding an acrylate series ultraviolet radiation setting resin of low dispersion. As regards the selection of these resins, it is determined in accordance with the combination of two or more resin materials, on the basis of optical design. Thus, depending on the use, an appropriate selection can be done and, additionally, the order of accumulation can be selected as desired.--

Please amend the paragraph starting at page 18, line 23, and ending at page 19, line 8, as follows.

--The second layer diffraction grating 12 has to be completely and intimately contacted to the first layer diffraction grating 11 after the mold releasing. Therefore, in order that the resin materials have sufficient adhesion strength against the mold releasing, a mold releasing agent application treatment may be ~~made~~ applied to the mold to improve the mold releasing property. In the mold releasing operation, a particular note should be

made to assure that, after the sample is placed in a sufficiently diluted releasing agent, vapor washing or the like is ~~made~~ performed to prevent that an excessive releasing agent disturbs the fine shape.--

Please amend the paragraph starting at page 24, line 14, and ending at line 26, as follows.

--Figure 12 is a sectional view of an accumulation-type diffractive optical element 101 according to a fourth embodiment of the present invention. Figure 13 is an enlarged section of an outer peripheral portion of this diffractive optical element 101. The diffractive optical element 101 comprises a diffraction grating 103 which is made of a resin and is formed on a glass substrate 102a, and another diffraction grating 104 which is made of a different resin with the same pitch as the grating 103 and is adhered to a glass substrate 102b. Between these diffraction gratings 103 and 104, there is an air gap G of 1.5 micron.--

Please amend the paragraphs starting at page 25, line 14, and ending at page 27, line 1, as follows.

--As regards the resin material of the diffraction grating 103 of this embodiment, methacrylate series ultraviolet radiation setting resin is used. The refractive index thereof after being set is 1.635, and its Abbe constant is 23. As regards the resin material of the diffraction grating 104, ~~an~~ a urethane denatured polyester acrylate series ultraviolet

radiation setting resin is used. The refractive index thereof after being set is 1.525, and its Abbe constant is 50.8.

In an accumulation-type diffractive optical element 101 to be used in an optical instrument such as a camera, for example, the grating shapes have to be determined in regard to the respective materials so that, with respect to the light of the used wavelength region such as c-line of a wavelength λ= 565.27 nm and g-line of a wavelength λ= 435.83 nm, for example, the light is concentrated to a particular order (usually, one of positive and negative first orders, but other orders are possible) and a high diffraction efficiency (95 - 100%) is accomplished. The gratings of the diffraction gratings 103 and 104 are so determined that a largest optical path difference to be applied to the light rays passing through them becomes equal to a multiple, by an integral number, of the wavelength, with respect to the light of plural wavelengths of c-line and g-line. As regards specific design examples for the determination, reference may be made to Japanese Laid-Open Patent Application, Laid-Open No. 448100/1999. In this embodiment, the diffraction grating 103 has a grating height of 6.74 microns, while the diffraction grating 104 has a grating height of 9.50 microns. Also, the grating 20 pitch of the periodic structure that produces the diffraction effect becomes smaller ~~as~~ with the distance away from the center of the diffraction grating. The smallest pitch is about 40 microns. The diffraction gratings 103 and 104 have the same pitch. They engage with each other, at recesses 103a and protrusions 104a which are formed around and outside of the optically effective regions of them, in a ring-like shape or at three or more locations.--

Please amend the paragraph starting at page 27, line 12, and ending at line 22, as follows.

--Similarly, Figure 16 is a sectional view of a mold 121 for producing the diffraction grating 104. Figure 17 is an enlarged view of an outer peripheral portion of this mold 121. At the outside of the optically effective region of it, there is a recess 122 for defining the protrusion 104a. The positions of the protrusion 112 and the recess 122 from the center of the diffraction lens should be the same also in the diffraction grating. Through practical cutting operations, the difference ~~of~~ between them can be 1 micron or less.--

Please amend the paragraphs starting at page 28, line 12, and ending at line 24, as follows.

--First, drops of a methacrylate series ultraviolet radiation setting resin, for providing a diffraction grating, of an amount controlled by a dispenser are applied onto the center of the molding surface of the mold 11. However, with a grating shape of a pitch 40 microns and a grating height 10 microns, ~~airs are~~ air is forced into the fine shape as the resin is diffused along the mold 111, causing a fault in shape of the molded article. In consideration of it, as the resin is diffused up to the protrusion 112 outside the optically effective region of the mold, de-foaming treatment may preferably be made in a vacuum container, with a reduced pressure of about 10 mmHg.--

Please amend the paragraphs starting at page 30, line 6, and ending at page 31, line 9, as follows.

--Subsequently, one of the diffraction gratings 103 and 104 produced in accordance with the method described above is held fixed by using a fixing tool. A thioxotropy series photo-setting adhesive agent of 10 low fluidity is applied, by drops, to plural locations outside the recess 103a or protrusion 104a and along a circumferential direction. The other diffraction grating is then placed to face the molding surface side, and they are put together with their centers aligned. By this, an accumulation-type diffractive optical element 101 having an accumulated layer structure is produced. Here, an interference fringe can be observed in the diffraction gratings 103 and 104, such that the rough adjustment for the centering may be done on the basis of it. Subsequently, after they are combined so that the circles of the recess 103a and protrusion 104a are registered with each other, ultraviolet rays are projected for the setting, whereby the accumulation-type diffractive optical element 101 can be completed.

Figure 20 is a sectional view of an accumulation-type diffractive optical element 131 according to a fifth embodiment of the present invention. While in the preceding embodiment two diffraction gratings 103 and 104 are adhered with each other to produce a diffractive optical element 101 of accumulated layer structure, in this embodiment a second layer diffraction grating 133 is directly accumulated upon a first layer diffraction grating 132 whereby an accumulation diffractive optical element 131 is produced.--